Description

A method for transmitting data, particularly having multimedia
contents, in a mobile communication network

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The present invention relates to a method for transmitting data,
particularly having multimedia contents, from a first communications
unit to a second communications unit in a mobile communication
network, whereby at least one transmission status message assigned

10   to the data is transmitted to the first communications unit.

Current mobile communication networks, such as networks operating
according to the GSM standard (GSM: Global System for Mobile
Communication), offer only limited possibilities for transmitting

15   textual data. Thus, for example, only text messages comprising up to
160 characters can be transmitted by means of the SMS (Short Message
Service). The cost of sending text messages of this type has to be
borne by the sender of the data.

20   In future, the transmission of multimedia data, particularly images
or films with or without audio, is also to be possible. The
successors to the essentially voice/text-based telecommunications
systems, such as those defined by the GSM standard for example, are
seen in multimedia-capable mobile communication systems, such as

25   those defined by the UMTS standard (UMTS: Universal Mobile
Telecommunications System) for example. The UMTS or GPRS standard
envisions providing, for example, in addition to the current SMS, a
so-called MMS (Multimedia Messaging Service) for transmitting
messages which can comprise multimedia contents, also referred to

as "Multimedia Messages" (MMs). Formatted text, images, videos and films with and without audio can also be transmitted by this means. The restriction to a message length of 160 characters present in the SMS does not apply.

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According to the state of the art, the MMS can be implemented by way of the WAP (Wireless Application Protocol), for example. For the purposes of bridging the air interface between an MMS-enabled terminal, such as a corresponding mobile phone, and the "WAP

10   Gateway" on the network side, the employment of the WAP-WSP (WSP: Wireless Session Protocol) [6] can be used according to [2].

For the purposes of the internal management of such MMS-over-WAP transmissions, use is made of so-called 'header fields', that is to

15   say fields placed in advance of the actual multimedia message (MM), which can contain items of information concerning origin, transmission time, file size and other details, for example.

If the MMS is implemented by way of the WAP in a mobile

20   communication network, at least one MMS connection unit or MM switching arrangement is provided within the network which takes over the handling of the MMs in that mobile communication network. This includes, for example, the switching of the MMs between the sender and the recipient and the intermediate storage of the MMs.

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In this respect, the sender first sends a message (MM) to the MMS connection unit, whereby the sender or the MMS connection unit can confer a period of validity on the message after the expiry of which the corresponding MM can no longer be downloaded from the MMS

30   connection unit by the recipient. The recipient receives the item of

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information concerning the period of validity until the expiry of
the MM together with the MMS recipient notification which is sent to
the recipient or the receiving MMS user application by the MMS
connection unit.

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A plurality of statuses which describe the transmission status of a
multimedia message (MM) is known from the MMS specification [2, 5].
Various statuses can indicate, for example, whether an MM has been
transmitted successfully (status: "Retrieved"), whether the MM has
10   been rejected by the recipient (status: "Rejected"), whether the
recipient has received the notification concerning the arrival of
the MM in its mailbox and can download said message later (status:
"Deferred"), whether the recipient has been able to recognize the MM
(status: "Unrecognized") and whether the recipient has not
15   downloaded the MM within a definable period of validity and
therefore received it in full (status: "Expired").

These statuses can be sent to the first telecommunications apparatus
by the switching arrangement in response to a request for a
20   transmission status message. These messages can be sent either
following an acknowledged recipient notification message or
following the successful delivery of an MM or following the expiry
of the period of validity of the MM.

25   If the sender of an MM receives the requested MMS transmission
status message relating to a message which it has sent, said sender
cannot decide in the event of the received status "expired", for
example, whether the recipient has intentionally not downloaded the
sent MM from the MMS connection unit or whether the recipient was

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just not available within the period of validity of the MM and
therefore the MM could not be delivered. The sender therefore has no
means of deciding whether it should possibly send the corresponding
MM again with an increased period of validity so that the MM can
5   reach the recipient.

The object of the present invention is therefore to offer the
transmitter or sender of data, particularly of a multimedia message
(MM), a more detailed item of information concerning the
10   deliverability of the data which it has sent.

This object is achieved in terms of a method as defined by Claim 1
and in terms of a switching arrangement as defined by Claim 12.

15   In the case of a method for transmitting data, particularly having
multimedia contents, from a first communications unit to a second
communications unit in a telecommunications network, at least one
transmission status message assigned to the data is transmitted to
the first communications unit, for example following the sending of
20   a data transmission. Furthermore, in the event of the non-
deliverability of the data to the second communications unit, an
item of information concerning the non-deliverability of the sent
data is provided in the transmission status message.

25   The method according to the invention enables the first
communications unit or a sender of data to recognize the fact that
the data which it has sent could not be delivered to the second
communications unit or an envisioned recipient. According to the
methods known in the state of the art, a sender of data has not been
30   able to recognize up to now whether the data could not be delivered

to a recipient due to an incorrect recipient address, for example,
or whether the recipient did not wish to receive the data. This item
of information is important to the sender of the data since in the
first case it could attempt to transmit the data again, whereas in

5   the second case such a repeat transmission is not worthwhile since
the recipient has already consciously decided not to opt to receive
the data.

To ensure that the data to be transmitted is kept up to date, the

10   sender of the data can define a period of validity within which the
data must be delivered to the recipient. The method according to the
invention can therefore be advantageously configured in such a way
that the item of information concerning the non-deliverability of
the sent data is provided in the transmission status message if the

15   data has not been delivered to the second communications unit within
the defined period of validity. In this case, the sender of the data
can decide, given the non-deliverability of the data, whether to
send the data to the second communications unit (recipient) again or
whether the data is already no longer up to date and therefore

20   should no longer be used.

One possible way of recognizing the non-deliverability of the data
sent to the second communications unit consists in implementing so-
called confirmation messages within a data transmission protocol

25   which is used in the case of the transmission of data between the
first and the second communications units. By means of such
confirmation messages, the recipient of data or messages notifies
the sender or in some circumstances possible switching centers
provided in the data transmission path of the fact that it has

correctly received the data or messages. "Correctly received" means, particularly in connection with the present description, that the recipient or the second communications unit can fully recognize the content of the data or messages transmitted. It is therefore

5   possible to define in the case of the method according to the invention that non-deliverability of the data sent applies if the correct receipt of the data sent and/or the receipt of a recipient notification message relating to the data to be transmitted to the second communications unit is not acknowledged by the second

10 communications unit by means of a respective associated confirmation message. It should be noted that the recipient notification message involves a message to the second communications unit to notify said communications unit that data is to be transmitted to it.

15 Telecommunications systems can provide for the eventuality that data from a sender is not forwarded direct to a recipient, but that the recipient receives a notification first that the wish exists to send data to it. Following the receipt of such a recipient notification message, the recipient can then choose whether it would like to

20 receive the data or have it delivered immediately or later or whether it is opting to decline to receive the data.

To ensure efficient data transmission between the first and the second communications units, the telecommunications network can

25 comprise a switching arrangement as defined by a further advantageous configuration, by way of which the data is transmitted from the first communications unit to the second. In this respect, the switching arrangement can be realized in such a way that it is

capable of establishing the non-deliverability of the data sent, for example by interrogating or capturing confirmation messages. It should be noted that if a switching arrangement receives data from the first communications unit, it can inform the second

5   communications unit of this with the above-mentioned recipient notification message. Furthermore, it can be the task of such a switching arrangement to send the transmission status message to the first communications unit and therefore to inform it of the status of the data to be transmitted. Such a switching arrangement within

10 the telecommunications network can be provided, for example, in a switching node of the network but, for example, the switching arrangement can also be distributed across a plurality of switching nodes or be implemented in units which otherwise possess no switching node properties but are still incorporated in the

15 telecommunications network.

The most diverse data, particularly having multimedia contents, can be sent particularly effectively by using the "Multimedia Messaging Service" (MMS), which provides a defined standard for formatting and

20 sending messages and data with multimedia contents (MMs: Multimedia Messages) [1, 2]. The MMS can be implemented advantageously by using the "Wireless Application Protocol" (WAP) [3, 4, 5, 6]. The WAP offers the possibility of transmitting the most diverse types of data, such as texts, images, videos and/or audio data for example,

25 and also of being able to access the Internet, in an efficient manner in mobile communication networks. More precise explanations of how data can be transmitted by means of MMS over WAP can be found, for example, in the references [3, 4, 5] relating to this description.

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In the case of the use of multimedia messages of the MMS over WAP, various data transfer and message transmissions are provided. Within the WAP protocol, as outlined in reference 5 relating to this description, each of these transmission types is described by means

5   of a data field "X-Mms-Message-Type" within the message.

Thus, within the method according to the invention, a recipient notification message would be an MMS-over-WAP message in the category "m-notification.ind" [5].

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The transmission of multimedia messages with the WAP protocol provides for the handling and the intermediate storage of the multimedia message by means of a switching center referred to as an "Mms-Relay/Server". From this, for example, data to be transmitted

15   is sent to the recipient.

Within the method according to the invention, the transmission of the multimedia message to the recipient preferably has the WAP category "m-retrieve.conf", as described in reference [5].

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The transmission status message according to the invention to the sender of the data to be transmitted can then be assigned to the category "m-delivery.ind" in line with the WAP protocol.

25   Within the WAP protocol, a field with the designation "X-Mms-Status" can be provided in transmission status messages of the type "m-delivery.ind", in which the transmission status of the data to be sent is recorded. A number or digit combination assigned to "non-deliverability" is advantageously recorded in this field in the

method according to the invention if non-deliverability of the data to the second communications unit applies. In the context of the parameters known to date, the value "<Octet 133>" particularly can be used for this.

Telecommunications devices with a mobile communication module can be used as communications units in the context of the present invention. These can constitute mobile telephones, for example, or even PCs (Personal Computers), laptops, palmtops, organizers or PDAs (PDA: Personal Digital Assistant) which comprise a mobile telecommunications module or, for example, are connected to a mobile telephone by way of a wire connection or a wireless local network (e.g. Bluetooth, infrared interface).

The telecommunications network can be realized as a mobile communication network at least in areas. The mobile communication network and/or the communications units can be realized, for example, as defined by one of the customary mobile communication standards, such as the GSM standard, the GPRS standard, the EDGE standard, the UMTS standard or one of the various CDMA standards, for example. The fact that the telecommunications network can be realized as a mobile communication network at least in areas means that at least one part of the transmission path between the first telecommunications unit and the second runs within a mobile communication network. Further parts of the transmission path can run, for example, on the Internet, in data networks and/or in fixed telecommunications networks or in combinations thereof. But it is also possible for the telecommunications network to be realized entirely as a mobile communication network or a combination of various mobile communication networks.

As defined by a further aspect, a switching arrangement is created for transmitting data in a telecommunications network from a first communications unit to a second communications unit, whereby the switching arrangement comprises an apparatus for producing or

5   generating a transmission status message which is assigned to the data to be transmitted to the second communications unit, whereby the apparatus for producing the transmission status message furthermore integrates an item of information concerning the non-deliverability of the data to be transmitted into the transmission

10   status message if the data cannot be delivered to the second communications unit.

It is possible with the switching arrangement described to notify the sender, or the first communications unit, of a message if data

15   which it has sent to a recipient, or the second communications unit, could not be delivered to the recipient at all. The sender can then decide, for example, to send the corresponding data again. Compared with the currently known state of the art on this matter, the sender is therefore given the opportunity to distinguish the non-

20   availability of a recipient from the status in which the recipient has not called up data provided for it, since it did not wish to receive the messages or was simply prevented from calling up the data (for example due to technical problems).

25   To ensure that the data to be sent has the most up to date status possible, it is possible to provide for the apparatus for producing the transmission status message of the switching arrangement to provide the item of information concerning the non-deliverability of the data to be transmitted in the transmission status message if the

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data cannot be delivered to the second communications unit within a
definable period of validity. Such a period of validity can be
defined, for example, by the sender of the data or even within the
telecommunications network (by means of a default setting, for

5   example). A period of validity can also be stored in the user
profile of an envisioned recipient of the data, for example. The
introduction of a period of validity following which data to be sent
is no longer delivered to a recipient makes sure that only up-to-
date data is ever waiting to be transmitted. This prevents mobile

10 communication networks or their switching arrangements being
burdened or even overburdened by old, no longer up to date messages,
for example.

If it has received the recipient notification message or the message

15 transmission or multimedia message, the recipient can notify the
switching arrangement that it has received the message (correctly).
'Correctly' in this connection means, as already mentioned in the
foregoing, that it can fully recognize the content of the respective
messages. If a user has not switched its telecommunications device

20 on over a complete period, for example, or if it is non-operational,
the switching arrangement will not receive any confirmation message
relating to corresponding transmissions to the second communications
unit.

25 The establishment of when "non-deliverability" of the data sent
applies can apply with regard to the switching arrangement if the
correct receipt of the data sent or of a recipient notification
message to the second communications unit relating to the data sent

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is not acknowledged by means of a respective associated confirmation message. It can be provided in the switching arrangement, for example, that the data to be transmitted is placed in intermediate storage in the switching arrangement and the envisioned recipient is
5   only informed by means of a notification (the recipient notification message) that a message, for example with corresponding multimedia data, is ready for it.

In the event that the recipient, particularly following the
10   transmission of a recipient notification message, does not wish to receive the assigned message, the correct receipt of the recipient notification message would indeed be acknowledged by the second communications unit but subsequently the transmission of the actual message not requested. No delivery takes place therefore, in spite
15   of notification of the second communications unit concerning data or messages to be transmitted.

To inform the sender (the first communications unit) concerning the respective transmission status of the data which it has sent, it is
20   possible to provide for the switching arrangement to comprise an apparatus for transmitting the transmission status message to the first communications unit. For example, the switching arrangement can send the transmission status message direct to the sender of the relevant data or even by way of another switching arrangement. But
25   the transmission status message could also be transmitted to a message store (a so-called "Mailbox") of the sender of the data, for example, from which it can then call up the transmission status message.

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Further preferred embodiments are contained in the sub-claims.

In the following, the invention is explained by way of example with reference to the enclosed diagrams. The diagrams show:

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Figure 1   a schematic representation of a telecommunications system for transmitting multimedia messages (MMs);

Figure 2   a chart to represent the flow of information in the case
10   of the sending of an MM within the WAP;

Figure 3   possible statuses of the X-Mms-Status of an "m-delivery.ind" transmission confirmation message for a multimedia message over WAP;

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Figure 4   an example of an "m-delivery.ind" transmission confirmation message for an MMS message over WAP.

Figure 1 shows an MMS network architecture according to the present-
20   day state of the art as defined by 3GPP (ref. [1, 2]). As a first MMS user application A (MMS User Agent A) 10, an application is shown, for example on a mobile communication device which corresponds to a first communications unit or on a device connected to a mobile communication device (e.g. laptop or similar) which
25   implements the MMS. Furthermore, a first MMS connection unit 20 is shown, for example in the form of a so-called "MMS-Relay/Server" which makes the MMS functionality available to the MMS user

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applications within an area of responsibility MMSE (MMSE: Multimedia
Messaging Service Environment) 22 of an MMS Service Provider A.
According to the state of the art, there is only one MMS connection
unit 20 per MMSE 22 in each case. The MMS connection unit 20 of the
5   Service Provider A is connected to a further MMS connection unit 30
of a Service Provider B, which in turn is in contact with a
recipient 40. This recipient 40 is represented by means of a second
MMS user application B (MMS User Agent B) 40 which similarly
represents an application, for example on a mobile communication
10   device which corresponds to a second communications unit.

A multimedia message is transmitted from the sender 10 to the
corresponding connection unit 20 of its Service Provider A 22. Since
the recipient of the message 40 is located in an area of
15   responsibility 32 of the second Service Provider B, the multimedia
message is conveyed to the connection unit 30 responsible for the
second area of responsibility 32. The message is then forwarded by
this switching unit to the recipient of the multimedia message 40.

20   The connections between the sender 10, the MMS connection unit A 20,
the MMS connection unit B 30 and the recipient 40 are shown with an
outgoing and an incoming arrow in each case in Figure 1 to document
the fact that in the case of the forwarding of the message,
corresponding receipt confirmation messages are also sent back to
25   the respective senders (sender 10, MMS connection unit A 20 and MMS
connection unit 30). It should be noted that the MMS connection
units 20 and 30 can be used as one switching arrangement.

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An example of the course of a transmission of a multimedia message
from a sender 110 (e.g. corresponding to the sender 10 in Fig. 1) to
a recipient 114 (e.g. corresponding to the recipient 40 in Fig. 1)
by way of an MMS switching unit 112 (e.g. corresponding to one or

5   both unit(s) 20, 30 in Fig. 1) is shown in detail in Figure 2.
Diagram 2 shows a message flow chart according to the present-day
state of the art as defined by [4], whereby the exchange of the WAP
messages or WAP items of information between three participating
entities - the MMS user application A (M-UA-A) 110, the MMS

10   switching unit (M-SR) 112 and the MMS user application B (M-UA-B)
114 - is shown in the case of the sending or receipt of an MM. The
sender of the data 110 comprises at least one telecommunications
device and similarly the recipient comprises a telecommunications
device. As already mentioned, these telecommunications devices can

15   be realized, for example, as customary handsets or as devices with
further input or display functions, such as laptops with a mobile
communication module, for example.

The exemplary embodiment shown in Figure 2 shows the transmission of

20   MMs by using the WAP standard as is used, for example, in the case
of the transmission of image data, video data, audio data and
formatted text data in the UMTS standard (UMTS: Universal Mobile
Telecommunication Standard). However, the present invention is also
correspondingly transferable to other telecommunications standards,

25   such as GSM or DECT (DECT: Digital European Cordless Telephone), for
example.

The items of information or messages which are shown with arrows in
the flow chart in Diagram 2 are exchanged between the three

30   participating entities 110, 112, 114. A multimedia message (MM)

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essentially consists of a header and optionally a body, which can contain the multimedia objects.

A multimedia message (MM) composed in or to be forwarded by way of

5   the telecommunications device of the sender 110 can contain one or more units or objects, for example individual images, film sequences, texts or similar. As shown in Figure 2, the MM is sent first to the Provider/the switching unit 112 as a request transmission (this bears the name "M-Send.req" in the WAP protocol).

10   From there, the MM received is acknowledged to the sender 110 with a return transmission "M-Send.conf".

Thereafter, a recipient notification message "M-Notificaton.ind" is sent to the envisioned recipient 114 by the switching unit 112, with

15   which said recipient is informed of the fact that an MM is ready for downloading for it at the switching unit 112. In this respect, the switching unit 112 receives the acknowledging reply message or recipient notification message "M-NotifyResp.ind" from the telecommunications device 114 of the recipient automatically, for

20   example, if said recipient has correctly received the recipient notification message.

Only upon request by the recipient 114 with the request message "WSP GET.req" is the MM forwarded to the recipient by the switching unit

25   112 with the MM transmission "M-Retrieve.conf".

A further receipt confirmation message, this time in the category "M-Acknowledge.ind", acknowledges the receipt of the MM.

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Finally, if so wished by the sender 110, the switching unit 112
sends a message "M-Delivery.ind", concerning the status of the
delivery of the MM, to said sender. It should be noted that in this
respect the transmission status message is generated by a first
5 apparatus (not shown) of the switching unit 112, which is provided
for the purpose, and is then sent by a second apparatus (also not
shown), which is provided for the purpose, from 112 to the sender
110. In this respect, the message "M-Delivery.ind" in the WAP
protocol, to which the present example refers, contains a status
10 field ("X-Mms-Status") 210 (Fig. 3) which describes the status of
the MM upon the sending of the status message "M-Delivery.ind".

Figure 3 shows in general terms the possible statuses 212 of the
status field "X-Mms-Status" 210 in the message of the type "M-
15 Delivery.ind" which is explained in detail in Figure 4. A plurality
of statuses are currently defined in the MMS specification [2, 5]
which are transmitted in an MMS delivery status notification·or
transmission status messages "M-Delivery.ind". The various statuses
indicate whether the MM has been transmitted successfully to the
20 recipient (status: "retrieved"), whether the MM has been rejected by
the recipient (status: "rejected"), whether the recipient has
received the notification concerning the arrival of the MM in its
mailbox and can download it later (status: "deferred"), whether the
recipient has not recognized the MM (status: "unrecognized") and
25 whether {the recipient} has not downloaded the MM within the period
of validity and has therefore not received it in full (status:
"expired").

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According to the invention, the status field "X-Mms-Status" can also take on a status "undeliverable". The new status ("undeliverable") is placed in the requested transmission status message "M-Delivery.ind" by the MMS connection unit 112 (see Fig. 2) if an MM

5   could not be delivered within its period of validity, that is to say that the connection unit has not received either the (first) receipt confirmation message "M-NotifyResp.ind" or the second receipt confirmation message "M-Acknowledge.ind" for the MM transmission from the recipient. This means that neither the MMS recipient

10 notification message (M-Notification.ind) nor the MM transmission (M-retrieve.conf) has reached the recipient correctly.

Figure 3 similarly shows how the corresponding statuses of the "X-Mms-Status" register in the present example are encoded within the

15 system. Thus, the values "<Octet 128>" to "<Octet 132>" are {assigned} to the known statuses "Expired" to "Unrecognized", whereas the status "Undeliverable" is represented with the value "<Octet 133>" within the system.

20 Figure 4 shows a transmission status message in the category "M-delivery.ind" as sent to the sender 10, 110 of a multimedia message by means of the WAP protocol. The header shows that the message is being sent from the switching unit 20, 30, 112 to the sender 10, 110. A first data field "X-Mms-Message-Type" shows what type of

25 message it is. In this case, it is the said notification of the sender of the MM concerning the transmission status of the MM message, which is categorized within the WAP protocol with "m-delivery.ind". The next data field, which is designated as "X-Mms-

version", documents the version of the MMS WAP protocol being used.
The following field with the designation "X-Mms-Message-ID" records
the internal number of the multimedia message (MM) to which the
transmission status message refers. The field with the designation

5   "To" contains the recipient, while the date field with the
designation "Date" contains the date on which the multimedia message
was last handled. For example, this can be the date of transmission
to the recipient, the date of rejection or even the expiry date of
the period of validity of the transmission to the recipient. The

10   last field in this transmission status message with the designation
"X-Mms-Status" shows the actual transmission status of the
multimedia message. In the present example, the MM is not capable of
being forwarded to the recipient or not deliverable, i.e. the
recipient has not acknowledged the recipient notification message or

15   even a plurality of recipient notification messages, for example,
because its telecommunications device was never switched on or is
faulty, for example.

The present invention describes a method for transmitting data,

20   particularly having multimedia contents, from a sender to a
recipient, whereby the non-deliverability of the data to the
recipient is notified to the sender if the message which said sender
has sent is not deliverable. Where relevant, the sender can then
send the message again. This allows efficient handling of multimedia

25   messages since, for example, the message would only be sent a second
time in the case of non-deliverability and not in the case that the
recipient does not want delivery. This distinction was not possible
in the current state of the art.

References
(Refs. [3], [4], [5], [6] are obtainable at
"http://www.wapforum.org/", for example)

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List of abbreviations

	GSM	Global System for Mobile Communication
	SMS	Short Message Service
5	UMTS	Universal Mobile Telecommunication System
	WAP	Wireless Application Protocol
	WSP	Wireless Session Protocol
	DECT	Digital European Cordless Telephone

10 ## MMS-specific abbreviations

	MM	Multimedia Message
	MMS	Multimedia Messaging Service
15	M-UA	MMS User Application
	M-SR	MMS Relay/Server
	M-Send.req	MMS transmission request
	M-Send.conf	MMS transmission confirmation
	M-Notification.ind	MMS recipient notification
20	M-NotifyResp.ind	MMS recipient notification confirmation
	W-WSP GET.req	MMS delivery request
	M-Retrieve.conf	MMS delivery message
	M-Acknowledge.ind	MMS delivery confirmation
	M-Delivery.ind	MMS delivery status notification